BRUHAT BANGALORE MAHANAGARA PALIKE

Name of the Work : 20.Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.

BYATARAYANAPURA DIVISION

TEST REPORT

1st & Part bill

TEJUS
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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Sri.M.S Venkatesh
Total Weight in gm:	3000

SIEVE ANALYSIS

Type of Material	40 mm down size			Proposed Use	PCC
Sample Location	Plant			Date of Sampling	16/05/18
				Date of Testing	16/05/18
IS Sieve Size	Weight Retained in gm	Cum. Weight Retained in gm	Cumulative Weight Retained in %	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size
80.00mm	0	0	0.00	100.00	100
63.00mm	0	0	0.00	100.00	-
40.00mm	98	98	3.27	96.73	95-100
20.00mm	1325	1423	47.43	52.57	30-70
10.00mm	1211	2634	87.80	12.20	10-35
4.75mm	326	2960	98.67	1.33	0-5
Pan	40	3000	100.00	0.00	

Remarks : ✓ Satisfactory / Not Satisfactory

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Consultant's Representative

TEJUS CONSULTANTS

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Test Report on Cement

Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Sri.M.S Venkatesh
Sample ID	Cement
Date of Sample Tested	16/05/18
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	40 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	358 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	7mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	28.00%	

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TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Sri.M.S Venkatseh

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	sand/M sand	Proposed Use	Drain
Location/Source	At site/Plant	Date of Sampling	16/05/18
Period of Soaking	24 hours	Date of Testing	16/05/18

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	Average
A	Weight of sturated surface dry sample gm.	649	648	652	
B	Weight of oven - dry sample gm.	642	640	644	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1686	1682	1684	
E	Bulk specific gravity $\frac{B}{(C+A-D)}$	2.697	2.656	2.650	2.668
G	Absorption (%) $\frac{(A-B)*100}{B}$	1.090	1.250	1.242	1.194

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	Tejus Consultants, Bangalore
Contractor	Sri.M.S Venkatseh

SIEVE ANALYSIS

Total Weight:	3000	gms			
Type of Material	Fine aggregate		Proposed Use	Drain	
Sample Location	At site/Plant		Date of Sampling	16/05/18	
			Date of Testing	16/05/18	

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	100
4.75 mm	226	226	7.53	92.47	90 - 100
2.36 mm	334	560	18.67	81.33	75 - 100
1.18 mm	557	1117	37.23	62.77	55 - 90
0.600 mm	548	1665	55.50	44.50	35 -59
0.300 mm	565	2230	74.33	25.67	8-30
0.150 mm	677	2907	96.90	3.10	0 - 10
Pan	93	3000			-

Remarks : ✓ Satisfactory / Not Satisfactory

Consultant's Representative

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Test Report on Cement

Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Sri.M.S Venkatesh
Sample ID	Cement
Date of Sample Tested	25/05/18
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	42 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	370 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	5mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	28.00%	

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike	
Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.	
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore	
Contractor	Sri.M.S Venkatseh	
Total Weight:	9500	gms

SIEVE ANALYSIS

Type of Material	20 mm down size	Proposed Use	Drain
Sample Location	Plant/ At site	Date of Sampling	25/05/18
		Date of Testing	25/05/18

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
40.00 mm	0	0	0	100	100
20.00 mm	265	265	2.79	97.21	95 - 100
10.00 mm	5412	5677	59.76	40.24	25 - 55
4.75 mm	3418	9095	95.74	4.26	0 - 10
Pan	405	9500			

Remarks : ✓ Satisfactory / Not Satisfactory

Consultant's Representative

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike		
Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura		
Consultants	TEJUS CONSULTANTS		
Contractor	Sri.M.S Venkatseh		
Total Weight:	10000	gms	

SIEVE ANALYSIS

Type of Material	12.5 mm down size	Proposed Use	Drain
Sample Location	Plant	Date of Sampling	25/05/18
		Date of Testing	25/05/18

IS Sieve Size (in mm)	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
20.0	0	0	0	100	100
12.5	585	585	5.85	94.15	90-100
10.0	3506	4091	40.91	59.09	40-85
4.75	5789	9880	98.80	1.20	0-10
Pan	120	10000			

Remarks : ✓ Satisfactory / Not Satisfactory

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TEJUS CONSULTANTS
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TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Sri.M.S Venkatesh

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	sand/M sand	Proposed Use	Drain
Location/Source	At site/Plant	Date of Sampling	25/05/18
Period of Soaking	24 hours	Date of Testing	25/05/18

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	Average
A	Weight of sturated surface dry sample gm.	648	670	668	
B	Weight of oven - dry sample gm.	638	658	656	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1683	1696	1694	
E	Bulk specific gravity $\frac{B}{(C+A-D)}$	2.658	2.643	2.635	2.645
G	Absorption (%) $\frac{(A-B)*100}{B}$	1.567	1.824	1.829	1.740

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	Tejus Consultants, Bangalore
Contractor	

SIEVE ANALYSIS

Total Weight:	3000	gms			
Type of Material	Sand/M sand		Proposed Use	Drain	
Sample Location	At site/Plant		Date of Sampling	25/05/2018	
			Date of Testing	25/05/2018	

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	100
4.75 mm	218	218	7.27	92.73	90 - 100
2.36 mm	330	548	18.27	81.73	75 - 100
1.18 mm	580	1128	37.60	62.40	55 - 90
0.600 mm	542	1670	55.67	44.33	35 -59
0.300 mm	600	2270	75.67	24.33	8-30
0.150 mm	650	2920	97.33	2.67	0 - 10
Pan	80	3000			-

Remarks : ✓ Satisfactory / Not Satisfactory

Consultant's Representative

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Test report on Compressive strength of concrete cubes

Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Sri.M.S Venkatesh
Grade of concrete:	M20
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	25/05/2018	01/06/18	7 days	8.255	22500	298	13.24	13.33
2	25/05/2018	01/06/18	7 days	8.325	22500	300	13.33	
3	25/05/2018	01/06/18	7 days	8.230	22500	302	13.42	

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Test report on Compressive strength of concrete cubes

Project	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Sri.M.S Venkatesh
Grade of concrete:	M20
Size of cube:	150x150x150 mm
Reference IS code:	IS:516-1959

Sl.No.	Date of Casting	Date of testing	Age of Test	Weight of Cube	Area of Cube	Failure load	Compressive strength	Avg. Compressive strength
				Kg	mm^2	KN	N/mm^2	N/mm^2
1	25/05/2018	22/06/18	28 days	8.335	22500	450	20.00	20.22
2	25/05/2018	22/06/18	28 days	8.340	22500	455	20.22	
3	25/05/2018	22/06/18	28 days	8.300	22500	460	20.44	

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PRECAST SLAB (CORE) TEST REPORT		
Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Sri.M.S Venkatesh
Consultant	:	TEJUS CONSULTANTS
Name of Work	:	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
No.of Sample Tested	:	3
Date of Testing	:	21/06/2018
Techinical Reference	:	IS:516-1959 (Reaffirmed 1999), SP-24:1983.
Grade of Concrete	:	M_{20}. 100mm thick

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	80.00	0.390	2482.82	1.60	0.960	38.00	19.35	20.90	20.07	25.08
2	50.00	80.00	0.384	2444.62	1.60	0.960	37.95	19.33	20.87	20.04	25.05
3	50.00	80.00	0.381	2425.52	1.60	0.960	38.15	19.43	20.98	20.14	25.18

Note:

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2. The results indicated above are based on the tests carried out on the samples received in the laboratory.
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PRECAST SLAB (CORE) TEST REPORT		
Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Sri.M.S Venkatesh
Consultant	:	TEJUS CONSULTANTS
Name of Work	:	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
No.of Sample Tested	:	3
Date of Testing	:	21/06/2018
Techinical Reference	:	IS:516-1959 (Reaffirmed 1999), SP-24:1983.
Grade of Concrete	:	M_{20} . 100mm thick

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	80.00	3.900	24828.17	1.60	0.960	38.20	19.46	21.01	20.17	25.21
2	50.00	80.00	3.950	25146.48	1.60	0.960	38.20	19.46	21.01	20.17	25.21
3	50.00	80.00	0.400	2546.48	1.60	0.960	38.70	19.71	21.29	20.44	25.54

Note:

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PRECAST SLAB (CORE) TEST REPORT		
Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Sri.M.S Venkatesh
Consultant	:	TEJUS CONSULTANTS
Name of Work	:	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
No.of Sample Tested	:	3
Date of Testing	:	21/06/2018
Techinical Reference	:	IS:516-1959 (Reaffirmed 1999), SP-24:1983.
Grade of Concrete	:	M_{20} - 100mm thick

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	50.00	80.00	0.400	2546.48	1.60	0.960	38.20	19.46	21.01	20.17	25.21
2	50.00	80.00	0.395	2514.65	1.60	0.960	38.35	19.53	21.09	20.25	25.31
3	50.00	80.00	0.392	2495.55	1.60	0.960	38.50	19.61	21.18	20.33	25.41

Note:

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PRECAST SLAB (CORE) TEST REPORT		
Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Sri.M.S Venkatesh
Name of Work	:	Improvements to Balance Roads, and Drains at Dasarahalli Village, Dasarahalli Colony, Mariyyanapalya and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
No.of Sample Tested	:	3
Date of Testing	:	21/06/2018
Techinical Reference	:	IS:516-1959 (Reaffirmed 1999), SP-24:1983.
Grade of Concrete	:	M_{20} - 250mm Thick

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	100.00	180.00	3.500	2475.74	1.80	0.960	159.95	20.37	21.99	21.11	26.39
2	100.00	180.00	3.510	2482.82	1.80	0.960	161.00	20.50	22.14	21.25	26.57
3	100.00	180.00	3.450	2440.38	1.80	0.960	160.00	20.37	22.00	21.12	26.40

Note:

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BRUHAT BANGALORE MAHANAGARA PALIKE

Name of the Work : 21.Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.

BYATARAYANAPURA DIVISION

TEST REPORT

1st & Part bill

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Sri. M. S. Venkatesh
Total Weight in gm:	3000

SIEVE ANALYSIS

Type of Material	40 mm down size			Proposed Use	PCC
Sample Location	Plant			Date of Sampling	08/06/2018
				Date of Testing	08/06/2018
IS Sieve Size	Weight Retained in gm	Cum. Weight Retained in gm	Cumulative Weight Retained in %	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size
80.00mm	0	0	0.00	100.00	100
63.00mm	0	0	0.00	100.00	-
40.00mm	110	110	3.67	96.33	95-100
20.00mm	1350	1460	48.67	51.33	30-70
10.00mm	1250	2710	90.33	9.67	10-35
4.75mm	200	2910	97.00	3.00	0-5
Pan	90	3000	100.00	0.00	

Remarks : Satisfactory / Not Satisfactory

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Test Report on Cement

Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Sri. M. S. Venkatesh
Sample ID	Cement
Date of Sample Tested	08/06/2018
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	35 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	370 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	6mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	28.00%	

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TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Sri. M. S. Venkatesh

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	sand/M sand	Proposed Use	Drain
Location/Source	At site/Plant	Date of Sampling	08/06/2018
Period of Soaking	24 hours	Date of Testing	08/06/2018

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	Average
A	Weight of sturated surface dry sample gm.	650	649	651	
B	Weight of oven - dry sample gm.	642	640	644	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1686	1682	1684	
E	Bulk specific gravity B / (C + A - D)	2.686	2.645	2.661	2.664
G	Absorption (%) (A - B) *100 / B	1.246	1.406	1.087	1.246

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	Tejus Consultants, Bangalore
Contractor	Sri. M. S. Venkatesh

SIEVE ANALYSIS

Total Weight:	3000 gms				
Type of Material	Fine aggregate		Proposed Use	Drain	
Sample Location	At site/Plant		Date of Sampling	08/06/2018	
			Date of Testing	08/06/2018	
IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	100
4.75 mm	215	215	7.17	92.83	90 - 100
2.36 mm	320	535	17.83	82.17	75 - 100
1.18 mm	560	1095	36.50	63.50	55 - 90
0.600 mm	555	1650	55.00	45.00	35 -59
0.300 mm	570	2220	74.00	26.00	8-30
0.150 mm	677	2897	96.57	3.43	0 - 10
Pan	103	3000			-

Remarks : ✓ Satisfactory / Not Satisfactory

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

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Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Sri. M. S. Venkatesh		
Proposed Use	WMM	**Date of Sampling**	25/06/2018
Sample Location	At plant	**Date of Testing**	25/06/2018

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	390.00	386.00	380.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	296.00	290.00	292.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	94.00	96.00	88.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	24.10	24.87	23.16	
5	Average Aggregate impact value	(%)	24.04			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	25/06/2018
		Date of Testing	25/06/2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	899	86	905	89
16.0	12.5	1225	92	1005	125
12.5	10.0	521	85	406	51
10.0	6.3	520	77	435	31
Total		3165	340	2751	296

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.74
Elongation Index(%):	10.76
Combined FI+EL (%)	21.50

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	25/06/2018
		Date of Testing	25/06/2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	900	79	911	88
16.0	12.5	1011	88	1112	101
12.5	10.0	458	82	425	65
10.0	6.3	550	77	441	25
Total		2919	326	2889	279

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.17
Elongation Index(%):	9.66
Combined FI+EL (%)	20.83

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	25/06/2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	25/06/2018
Type of material & Purpose:	WMM	**Date of testing:**	25/06/2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	369	369	3.69	96.31	95-100
22.4	2596	2965	29.65	70.35	60-80
11.2	1789	4385	43.85	56.15	40-60
4.75	5022	6811	68.11	31.89	25-40
2.36	3221	8243	82.43	17.57	15-30
0.6	5696	8917	89.17	10.83	8.0-22.0
0.075	3642	9338	93.38	6.62	0-8
Pan	662				
Total	10000				

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	25/06/2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	25/06/2018
Type of material & Purpose:	WMM	**Date of testing:**	25/06/2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	340	340	3.40	96.60	95-100
22.4	2552	2892	28.92	71.08	60-80
11.2	1962	4854	48.54	51.46	40-60
4.75	2001	6855	68.55	31.45	25-40
2.36	1256	8111	81.11	18.89	15-30
0.6	1225	9336	93.36	6.64	8.0-22.0
0.075	456	9792	97.92	2.08	0-8
Pan	208				
Total	10000				

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Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	28/06/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6242	6354	6566
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9770	9735	9632
Wt. of sand in cone (w3) gms.	835	810	820
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3395	3455	3548
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.41	2.43	2.42
Moisture meter reading(moisture content)	12.69	12.62	12.64
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.14	2.16	2.15
MDD	2.18	2.18	2.18
OMC	12.70%	12.70%	12.70%
% of Compaction Obtained	98.04	98.88	98.73
Compaction Required	98%	98%	98%

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬೆಂಗಳೂರು-26

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Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	28/06/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6553	6245	6543
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9590	9781	9612
Wt. of sand in cone (w3) gms.	832	810	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3578	3409	3552
Bulk density of sand (γs)gm/cc	1.32	1.32	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.42	2.42	2.43
Moisture meter reading(moisture content)	12.43	12.45	12.47
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.15	2.15	2.16
MDD	2.19	2.19	2.19
OMC	12.59%	12.59%	12.59%
% of Compaction Obtained	98.19	98.19	98.72
Compaction Required	98%	98%	98%

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ಸಹಾಯಕ ಅಭಿಯಂತರ
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-24

Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	28/06/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6551	6252	6538
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9591	9780	9612
Wt. of sand in cone (w3) gms.	832	810	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3577	3410	3552
Bulk density of sand (γs)gm/cc	1.32	1.32	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.42	2.42	2.43
Moisture meter reading(moisture content)	12.43	12.45	12.47
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.15	2.15	2.16
MDD	2.19	2.19	2.19
OMC	12.59%	12.59%	12.59%
% of Compaction Obtained	98.18	98.27	98.64
Compaction Required	98%	98%	98%

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ಬಿಬಿಎಂಪಿ, ಬೆಂಗಳೂರು-26

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PRECAST SLAB (CORE) TEST REPORT		
Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Sri. M. S. Venkatesh
Name of Work	:	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
No.of Sample Tested	:	3
Date of Testing	:	04/07/18
Techinical Reference	:	IS:516-1959 (Reaffirmed 1999), SP-24:1983.
Grade of Concrete	:	M_{20} . 250mm Thick

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	100.00	180.00	3.510	2482.82	1.80	0.960	160.00	20.37	22.00	21.12	26.40
2	100.00	180.00	3.520	2489.89	1.80	0.960	160.30	20.41	22.04	21.16	26.45
3	100.00	180.00	3.490	2468.67	1.80	0.960	160.80	20.47	22.11	21.23	26.53

Note:

1. The report shall not be reproduced, except in full, without the written approval of the laboratory.
2. The results indicated above are based on the tests carried out on the samples received in the laboratory.
3. Any Query regarding the report must be reported reported within 15 days from the date of testing.

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Consultant's Representative

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-24

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

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Project	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Sri. M. S. Venkatesh		
Proposed Use	BC	Date of Sampling	16/07/2018
Sample Location	At plant	Date of Testing	16/07/2018

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	380.00	362.00	364.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	299.00	284.00	286.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	81.00	78.00	78.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	21.32	21.55	21.43	
5	Average Aggregate impact value	(%)	21.43			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿ
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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project :	**Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**
Client :	**BRUHAT BANGALORE MAHANAGARA PALIKE**
Consultant :	**M/s Tejus Consultants**
Contractor:	**Sri. M. S. Venkatesh**

Type of Material	BC	**Proposed Use**	BC
Sample Location	At plant	**Date of Sampling**	16/07/2018
		Date of Testing	16/07/2018

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	552	89	660	62
16.0	12.5	1252	110	1122	81
12.5	10.0	662	75	585	101
10.0	6.3	542	74	595	78
Total		**3008**	**348**	**2962**	**322**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.57
Elongation Index(%):	10.87
Combined FI+EL (%)	22.44

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GRADATION FOR BC
(As per MORT&H 500-17,Grading-2)

Name of Work	:	**Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	16/07/2018
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	16/07/2018
Type of material & Purpose:	BC	Date of testing:	16/07/2018
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	86	86.0	7.17	92.83	90 - 100
9.50	120	206.0	17.17	82.83	70 - 88
4.75	210	416.0	34.67	65.33	53 - 71
2.360	200	616.0	51.33	48.67	42 - 58
1.180	160	776.0	64.67	35.33	34 - 48
0.600	125	901.0	75.08	24.92	26 - 38
0.300	55	956.0	79.67	20.33	18 - 28
0.150	45	1001.0	83.42	16.58	12 - 20
0.075	130	1131.0	94.25	5.75	4 - 10
Pan	69.0				
Total	1200.0				

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GRADATION FOR BC
(As per MORT&H 500-17,Grading-2)

Name of Work	:	**Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	17/07/2018
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	17/07/2018
Type of material & Purpose:	BC	Date of testing:	17/07/2018
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	85	85.0	7.08	92.92	90 - 100
9.50	121	206.0	17.17	82.83	70 - 88
4.75	221	427.0	35.58	64.42	53 - 71
2.360	181	608.0	50.67	49.33	42 - 58
1.180	162	770.0	64.17	35.83	34 - 48
0.600	137	907.0	75.58	24.42	26 - 38
0.300	69	976.0	81.33	18.67	18 - 28
0.150	59	1035.0	86.25	13.75	12 - 20
0.075	105	1140.0	95.00	5.00	4 - 10
Pan	60.0				
Total	1200.0				

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX	
Name of Work :	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	17/07/2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	980	989
2. Weight of Mixture after extraction, g	926	935
3. Weight of Bitumen	54	54
4. Weight of filter paper before extraction, g	4.00	4.00
5. Weight of filter paper after extraction, g	5.00	5.00
6. Weight of fines, g	1.00	1.00
7. Weight of Bitumen & fines	55.00	55.00
8. Bitumen content in %	5.61	5.56
9. Average Bitumen content in %	5.59	
10. Minimum Bitumen content in %	5.40	

GRADATION FOR BC AFTER EXTRACTION
(As per MORT&H 500-17,Grading-2)

Sample Location:	At site	Date of Sampling:	17/07/2018
Type of material & Purpose:	BC	Date of testing:	17/07/2018
		Oven Dry Wt.(gms):	926.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	69	69.0	7.45	92.55	90 - 100
9.50	125	194.0	20.95	79.05	70 - 88
4.75	149	343.0	37.04	62.96	53 - 71
2.360	152	495.0	53.46	46.54	42 - 58
1.180	101	596.0	64.36	35.64	34 - 48
0.600	89	685.0	73.97	26.03	26 - 38
0.300	55	740.0	79.91	20.09	18 - 28
0.150	51	791.0	85.42	14.58	12 - 20
0.075	88	879.0	94.92	5.08	4 - 10
Pan	47.0				
Total	926.0				

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX	
Name of Work :	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	18/07/2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	981	982
2. Weight of Mixture after extraction, g	927	928
3. Weight of Bitumen	54	54
4. Weight of filter paper before extraction, g	4.00	4.00
5. Weight of filter paper after extraction, g	5.00	5.00
6. Weight of fines, g	1.00	1.00
7. Weight of Bitumen & fines	55.00	55.00
8. Bitumen content in %	5.61	5.60
9. Average Bitumen content in %	5.60	
10. Minimum Bitumen content in %	5.40	

GRADATION FOR BC AFTER EXTRACTION
(As per MORT&H 500-17,Grading-2)

Sample Location:	At site	Date of Sampling:	18/07/2018
Type of material & Purpose:	BC	Date of testing:	18/07/2018
		Oven Dry Wt.(gms):	927.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	75	75.0	8.09	91.91	90 - 100
9.50	180	255.0	27.51	72.49	70 - 88
4.75	149	404.0	43.58	56.42	53 - 71
2.360	132	536.0	57.82	42.18	42 - 58
1.180	88	624.0	67.31	32.69	34 - 48
0.600	45	669.0	72.17	27.83	26 - 38
0.300	75	744.0	80.26	19.74	18 - 28
0.150	42	786.0	84.79	15.21	12 - 20
0.075	88	874.0	94.28	5.72	4 - 10
Pan	53.0				
Total	927.0				

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TEJUS
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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	17/07/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.880	0.880	0.880
Final weight of plate after application of tack Coat (c)	Kg	0.903	0.904	0.905
Weight of tack Coat (d=c-b)	Kg	0.023	0.024	0.025
Rate of spread of tack coat	Kg/sq.m	0.256	0.267	0.278
Average	Kg/sq.m	0.267		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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TEJUS
CONSULTANTS

DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at Bhuvaneshwarinagara, Maruthi Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	18/07/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.880	0.880	0.880
Final weight of plate after application of tack Coat (c)	Kg	0.900	0.905	0.906
Weight of tack Coat (d=c-b)	Kg	0.020	0.025	0.026
Rate of spread of tack coat	Kg/sq.m	0.222	0.278	0.289
Average	Kg/sq.m	0.263		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬೆಂಗಳೂರು-24

BRUHAT BANGALORE MAHANAGARA PALIKE

Name of the Work : 22.Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.

BYATARAYANAPURA DIVISION

TEST REPORT

1st & Part bill

TEJUS
CONSULTANTS

GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	16/07/2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	16/07/2018
Type of material & Purpose:	WMM	**Date of testing:**	16/07/2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	350	350	3.50	96.50	95-100
22.4	2320	2670	26.70	73.30	60-80
11.2	1850	4520	45.20	54.80	40-60
4.75	1920	6440	64.40	35.60	25-40
2.36	1340	7780	77.80	22.20	15-30
0.6	1315	9095	90.95	9.05	8.0-22.0
0.075	650	9745	97.45	2.55	0-8
Pan	255				
Total	10000				

ಸಹಾಯಕ ಅಭಿಯಂತರರು
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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-24

TEJUS
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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	16/07/2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	16/07/2018
Type of material & Purpose:	WMM	**Date of testing:**	16/07/2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	375	375	3.75	96.25	95-100
22.4	2595	2970	29.70	70.30	60-80
11.2	1780	4375	43.75	56.25	40-60
4.75	5025	6805	68.05	31.95	25-40
2.36	3200	8225	82.25	17.75	15-30
0.6	5690	8890	88.90	11.10	8.0-22.0
0.075	3640	9330	93.30	6.70	0-8
Pan	670				
Total	10000				

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರ
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬೆಂಗಳೂರು-26

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Type of Material	WMM	Proposed Use	WMM
Sample Location	At plant	Date of Sampling	16/07/2018
		Date of Testing	16/07/2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	912	88	910	82
16.0	12.5	1031	97	1010	120
12.5	10.0	483	88	410	52
10.0	6.3	534	75	465	32
Total		2960	348	2795	286

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.76
Elongation Index(%):	10.23
Combined FI+EL (%)	21.99

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ಸಹಾಯಕ ಕಾರ್ಯ ಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

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Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Sri. M. S. Venkatesh		
Proposed Use	WMM	**Date of Sampling**	18/07/2018
Sample Location	At plant	**Date of Testing**	18/07/2018

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	388.00	378.00	382.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	298.00	288.00	292.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	90.00	90.00	90.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	23.20	23.81	23.56	
5	Average Aggregate impact value	(%)	23.52			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರ
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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	18/07/2018
		Date of Testing	18/07/2018

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	911	88	910	85
16.0	12.5	1025	85	1025	111
12.5	10.0	481	96	420	56
10.0	6.3	520	75	435	35
Total		2937	344	2790	287

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.71
Elongation Index(%):	10.29
Combined FI+EL (%)	22.00

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರ
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬೆಂಗಳೂರು-24

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Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh
Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)	
Date of Testing	18/07/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6590	6295	6525
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9565	9775	9600
Wt. of sand in cone (w3) gms.	832	810	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3603	3415	3564
Bulk density of sand (γs)gm/cc	1.32	1.32	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.41	2.43	2.42
Moisture meter reading(moisture content)	12.43	12.45	12.47
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.15	2.16	2.15
MDD	2.19	2.19	2.19
OMC	12.59%	12.59%	12.59%
% of Compaction Obtained	98.05	98.80	98.12
Compaction Required	98%	98%	98%

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	18/06/2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	18/07/2018
Type of material & Purpose:	WMM	**Date of testing:**	18/07/2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	355	355	3.55	96.45	95-100
22.4	2520	2875	28.75	71.25	60-80
11.2	1890	4765	47.65	52.35	40-60
4.75	1925	6690	66.90	33.10	25-40
2.36	1225	7915	79.15	20.85	15-30
0.6	1115	9030	90.30	9.70	8.0-22.0
0.075	760	9790	97.90	2.10	0-8
Pan	210				
Total	10000				

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ಸಹಾಯಕ ಕಾರ್ಯ ನಿರ್ವಾಹಕ ಅಭಿಯಂತರರು
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ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-24

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Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	18/07/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6545	6254	6540
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9591	9783	9601
Wt. of sand in cone (w3) gms.	832	810	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3577	3407	3563
Bulk density of sand (γs)gm/cc	1.32	1.32	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.42	2.42	2.42
Moisture meter reading(moisture content)	12.43	12.45	12.47
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.15	2.15	2.15
MDD	2.19	2.19	2.19
OMC	12.59%	12.59%	12.59%
% of Compaction Obtained	98.09	98.39	98.37
Compaction Required	98%	98%	98%

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Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	20/07/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6240	6350	6560
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9770	9725	9620
Wt. of sand in cone (w3) gms.	835	810	820
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3395	3465	3560
Bulk density of sand (ys)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (yb)=(Ww/w4*(ys))gm/cc	2.41	2.42	2.41
Moisture meter reading(moisture content)	12.69	12.62	12.64
Result			
FDD(Wt.of the dry material)=(100yb/100+mc)gm/cc	2.14	2.15	2.14
MDD	2.18	2.18	2.18
OMC	12.70%	12.70%	12.70%
% of Compaction Obtained	98.01	98.53	98.31
Compaction Required	98%	98%	98%

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Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	20/07/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	1	2	3
Wt. of wet material from hole (Ww) gms.	6552	6240	6540
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9592	9782	9610
Wt. of sand in cone (w3) gms.	832	810	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3576	3408	3554
Bulk density of sand (γs)gm/cc	1.32	1.32	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.42	2.42	2.43
Moisture meter reading(moisture content)	12.43	12.45	12.47
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.15	2.15	2.16
MDD	2.19	2.19	2.19
OMC	12.59%	12.59%	12.59%
% of Compaction Obtained	98.23	98.14	98.62
Compaction Required	98%	98%	98%

ಸಹಾಯಕ ಅಭಿಯಂತರರು
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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
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ಬೆಂಗಳೂರು-26

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Project	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	20/07/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6555	6256	6535
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9592	9782	9610
Wt. of sand in cone (w3) gms.	832	810	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3576	3408	3554
Bulk density of sand (γs)gm/cc	1.32	1.32	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.42	2.42	2.43
Moisture meter reading(moisture content)	12.43	12.45	12.47
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.15	2.15	2.16
MDD	2.19	2.19	2.19
OMC	12.59%	12.59%	12.59%
% of Compaction Obtained	98.27	98.39	98.54
Compaction Required	98%	98%	98%

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

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Project	**Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**		
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**		
Consultant	**M/s Tejus Consultants**		
Contractor	**Sri. M. S. Venkatesh**		
Proposed Use	BC	**Date of Sampling**	**31/07/2018**
Sample Location	At plant	**Date of Testing**	**31/07/2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	372.00	365.00	362.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	295.00	288.00	289.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	77.00	77.00	73.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	20.70	21.10	20.17	
5	Average Aggregate impact value	(%)	20.65			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project :	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor:	Sri. M. S. Venkatesh

Type of Material	BC	Proposed Use	BC
Sample Location	At plant	Date of Sampling	31/07/2018
		Date of Testing	31/07/2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	550	90	650	60
16.0	12.5	1250	101	1129	84
12.5	10.0	660	80	580	100
10.0	6.3	540	69	601	76
Total		3000	340	2960	320

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.33
Elongation Index(%):	10.81
Combined FI+EL (%)	22.14

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GRADATION FOR BC
(As per MORT&H 500-17,Grading-2)

Name of Work	:	**Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	31/07/2018
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	31/07/2018
Type of material & Purpose:	BC	Date of testing:	31/07/2018
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	96	96.0	8.00	92.00	90 - 100
9.50	115	211.0	17.58	82.42	70 - 88
4.75	198	409.0	34.08	65.92	53 - 71
2.360	178	587.0	48.92	51.08	42 - 58
1.180	155	742.0	61.83	38.17	34 - 48
0.600	135	877.0	73.08	26.92	26 - 38
0.300	66	943.0	78.58	21.42	18 - 28
0.150	50	993.0	82.75	17.25	12 - 20
0.075	121	1114.0	92.83	7.17	4 - 10
Pan	86.0				
Total	1200.0				

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GRADATION FOR BC
(As per MORT&H 500-17,Grading-2)

Name of Work	:	**Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	01/08/2018
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	01/08/2018
Type of material & Purpose:	BC	Date of testing:	01/08/2018
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	80	80.0	6.67	93.33	90 - 100
9.50	125	205.0	17.08	82.92	70 - 88
4.75	220	425.0	35.42	64.58	53 - 71
2.360	185	610.0	50.83	49.17	42 - 58
1.180	160	770.0	64.17	35.83	34 - 48
0.600	135	905.0	75.42	24.58	26 - 38
0.300	65	970.0	80.83	19.17	18 - 28
0.150	62	1032.0	86.00	14.00	12 - 20
0.075	101	1133.0	94.42	5.58	4 - 10
Pan	67.0				
Total	1200.0				

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TEJUS
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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	01/08/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.870	0.870	0.870
Final weight of plate after application of tack Coat (c)	Kg	0.894	0.893	0.893
Weight of tack Coat (d=c-b)	Kg	0.024	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.267	0.256	0.256
Average	Kg/sq.m	0.259		
Specified Limit	Kg/sq.m	0.250 Kg/sq.m		

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TEJUS
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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX	
Name of Work :	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	01/08/2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT		
Description	**Trail 1**	**Trail 2**
1. Weight of Mixture before extraction, g	982	984
2. Weight of Mixture after extraction, g	928	929
3. Weight of Bitumen	54	55
4. Weight of filter paper before extraction, g	4.00	4.00
5. Weight of filter paper after extraction, g	5.00	5.00
6. Weight of fines, g	1.00	1.00
7. Weight of Bitumen & fines	55.00	56.00
8. Bitumen content in %	5.60	5.69
9. Average Bitumen content in %	5.65	
10. Minimum Bitumen content in %	5.40	

GRADATION FOR BC AFTER EXTRACTION (As per MORT&H 500-17,Grading-2)			
Sample Location:	At site	Date of Sampling:	01/08/2018
Type of material & Purpose:	BC	Date of testing:	01/08/2018
		Oven Dry Wt.(gms):	928.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	77	77.0	8.30	91.70	90 - 100
9.50	175	252.0	27.16	72.84	70 - 88
4.75	151	403.0	43.43	56.57	53 - 71
2.360	125	528.0	56.90	43.10	42 - 58
1.180	92	620.0	66.81	33.19	34 - 48
0.600	55	675.0	72.74	27.26	26 - 38
0.300	72	747.0	80.50	19.50	18 - 28
0.150	46	793.0	85.45	14.55	12 - 20
0.075	85	878.0	94.61	5.39	4 - 10
Pan	50.0				
Total	928.0				

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TEJUS
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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	01/08/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.870	0.870	0.870
Final weight of plate after application of tack Coat (c)	Kg	0.896	0.891	0.895
Weight of tack Coat (d=c-b)	Kg	0.026	0.021	0.025
Rate of spread of tack coat	Kg/sq.m	0.289	0.233	0.278
Average	Kg/sq.m	0.267		
Specified Limit	Kg/sq.m	0.250 Kg/sq.m		

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TEJUS
CONSULTANTS

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX	
Name of Work :	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	02/08/2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	982	985
2. Weight of Mixture after extraction, g	928	931
3. Weight of Bitumen	54	54
4. Weight of filter paper before extraction, g	4.00	4.00
5. Weight of filter paper after extraction, g	5.00	5.00
6. Weight of fines, g	1.00	1.00
7. Weight of Bitumen & fines	55.00	55.00
8. Bitumen content in %	5.60	5.58
9. Average Bitumen content in %	5.59	
10. Minimum Bitumen content in %	5.40	

GRADATION FOR BC AFTER EXTRACTION
(As per MORT&H 500-17,Grading-2)

Sample Location:	At site	Date of Sampling:	02/08/2018
Type of material & Purpose:	BC	Date of testing:	02/08/2018
		Oven Dry Wt.(gms):	928.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	73	73.0	7.87	92.13	90 - 100
9.50	131	204.0	21.98	78.02	70 - 88
4.75	151	355.0	38.25	61.75	53 - 71
2.360	141	496.0	53.45	46.55	42 - 58
1.180	96	592.0	63.79	36.21	34 - 48
0.600	65	657.0	70.80	29.20	26 - 38
0.300	81	738.0	79.53	20.47	18 - 28
0.150	55	793.0	85.45	14.55	12 - 20
0.075	87	880.0	94.83	5.17	4 - 10
Pan	48.0				
Total	928.0				

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	02/08/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.870	0.870	0.870
Final weight of plate after application of tack Coat (c)	Kg	0.895	0.893	0.892
Weight of tack Coat (d=c-b)	Kg	0.025	0.023	0.022
Rate of spread of tack coat	Kg/sq.m	0.278	0.256	0.244
Average	Kg/sq.m	0.259		
Specified Limit	Kg/sq.m	0.250 Kg/sq.m		

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at MS Ramaiah North City, Rasool Sab Layout, Anam Enclave and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	02/08/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.870	0.870	0.870
Final weight of plate after application of tack Coat (c)	Kg	0.894	0.894	0.892
Weight of tack Coat (d=c-b)	Kg	0.024	0.024	0.022
Rate of spread of tack coat	Kg/sq.m	0.267	0.267	0.244
Average	Kg/sq.m	0.259		
Specified Limit	Kg/sq.m	0.250 Kg/sq.m		

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BRUHAT BANGALORE MAHANAGARA PALIKE

Name of the Work : 23.Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.

BYATARAYANAPURA DIVISION

TEST REPORT

1st & Part bill

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CONSULTANTS

TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Sri. M. S. Venkatesh
Total Weight in gm:	3000

SIEVE ANALYSIS

Type of Material	40 mm down size			Proposed Use	PCC
Sample Location	Plant			Date of Sampling	15/06/2018
				Date of Testing	15/06/2018
IS Sieve Size	Weight Retained in gm	Cum. Weight Retained in gm	Cumulative Weight Retained in %	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size
80.00mm	0	0	0.00	100.00	100
63.00mm	0	0	0.00	100.00	-
40.00mm	121	121	4.03	95.97	95-100
20.00mm	1256	1377	45.90	54.10	30-70
10.00mm	1238	2615	87.17	12.83	10-35
4.75mm	300	2915	97.17	2.83	0-5
Pan	85	3000	100.00	0.00	

Remarks : Satisfactory / Not Satisfactory

Consultant's Representative

TEJUS CONSULTANTS

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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Test Report on Cement

Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Sri. M. S. Venkatesh
Sample ID	Cement
Date of Sample Tested	15/06/2018
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	40 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	360 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	4mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	28.00%	

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TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Sri. M. S. Venkatesh

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	sand/M sand	Proposed Use	Drain
Location/Source	At site/Plant	Date of Sampling	15/06/2018
Period of Soaking	24 hours	Date of Testing	15/06/2018

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	Average
A	Weight of sturated surface dry sample gm.	650	649	651	
B	Weight of oven - dry sample gm.	642	640	644	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1686	1682	1684	
E	Bulk specific gravity B / (C + A - D)	2.686	2.645	2.661	2.664
G	Absorption (%) (A - B) *100 / B	1.246	1.406	1.087	1.246

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Consultants	Tejus Consultants, Bangalore
Contractor	Sri. M. S. Venkatesh

SIEVE ANALYSIS

Total Weight:	3000 gms				
Type of Material	Fine aggregate		Proposed Use	Drain	
Sample Location	At site/Plant		Date of Sampling	15/06/2018	
			Date of Testing	15/06/2018	
IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	100
4.75 mm	215	215	7.17	92.83	90 - 100
2.36 mm	320	535	17.83	82.17	75 - 100
1.18 mm	560	1095	36.50	63.50	55 - 90
0.600 mm	555	1650	55.00	45.00	35 -59
0.300 mm	570	2220	74.00	26.00	8-30
0.150 mm	677	2897	96.57	3.43	0 - 10
Pan	103	3000			-

Remarks : ✓ Satisfactory / Not Satisfactory

Consultant's Representative

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PRECAST SLAB (CORE) TEST REPORT

Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Sri. M. S. Venkatesh
Name of Work	:	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
No.of Sample Tested	:	3
Date of Testing	:	26/06/2018
Techinical Reference	:	IS:516-1959 (Reaffirmed 1999), SP-24:1983.
Grade of Concrete	:	M_{20} - 250mm Thick

Sl. No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (kN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	100.00	180.00	3.432	2427.64	1.80	0.960	158.22	20.15	21.76	20.89	26.11
2	100.00	180.00	3.436	2430.47	1.80	0.960	157.80	20.09	21.70	20.83	26.04
3	100.00	180.00	3.425	2422.69	1.80	0.960	158.10	20.13	21.74	20.87	26.09

Note:

1. The report shall not be reproduced, except in full, without the written approval of the laboratory.
2. The results indicated above are based on the tests carried out on the samples received in the laboratory.
3. Any Query regarding the report must be reported reported within 15 days from the date of testing.

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Sri. M. S. Venkatesh		
Proposed Use	WMM	**Date of Sampling**	**27/06/2018**
Sample Location	**At plant**	**Date of Testing**	**27/06/2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	386.00	376.00	380.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	298.00	288.00	292.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	88.00	88.00	88.00	
4	Aggregate Impact Value (%)	(Wc/Wa)* 100	22.80	23.40	23.16	
5	Average Aggregate impact value	(%)	23.12			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	At plant	**Date of Sampling**	27/06/2018
		Date of Testing	27/06/2018

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	910	81	901	83
16.0	12.5	1030	93	1015	115
12.5	10.0	481	85	415	55
10.0	6.3	532	77	460	33
Total		2953	336	2791	286

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	11.38
Elongation Index(%):	10.25
Combined FI+EL (%)	21.63

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	27/06/2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	27/06/2018
Type of material & Purpose:	WMM	**Date of testing:**	27/06/2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	370	370	3.70	96.30	95-100
22.4	2596	2966	29.66	70.34	60-80
11.2	1782	4378	43.78	56.22	40-60
4.75	5000	6782	67.82	32.18	25-40
2.36	3215	8215	82.15	17.85	15-30
0.6	5692	8907	89.07	10.93	8.0-22.0
0.075	3651	9343	93.43	6.57	0-8
Pan	657				
Total	10000				

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Project:Improvements to Balance Roads, and Drains at BDS Layout, Shirdi Sai Rathanagara, Kaverinagara and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	27/06/2018
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	At plant	**Date of Sampling:**	27/06/2018
Type of material & Purpose:	WMM	**Date of testing:**	27/06/2018
		Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained (gm)	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	352	352	3.52	96.48	95-100
22.4	2315	2667	26.67	73.33	60-80
11.2	1856	4523	45.23	54.77	40-60
4.75	1902	6425	64.25	35.75	25-40
2.36	1359	7784	77.84	22.16	15-30
0.6	1215	8999	89.99	10.01	8.0-22.0
0.075	860	9859	98.59	1.41	0-8
Pan	141				
Total	10000				

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ಬೆಂಗಳೂರು-26

Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	28/06/2018
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6260	6358	6565
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9778	9720	9623
Wt. of sand in cone (w3) gms.	835	810	820
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3387	3470	3557
Bulk density of sand (ys)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (yb)=(Ww/w4*(ys))gm/cc	2.42	2.42	2.42
Moisture meter reading(moisture content)	12.69	12.62	12.64
Result			
FDD(Wt.of the dry material)=(100yb/100+mc)gm/cc	2.15	2.15	2.15
MDD	2.18	2.18	2.18
OMC	12.70%	12.70%	12.70%
% of Compaction Obtained	98.56	98.51	98.46
Compaction Required	98%	98%	98%

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Project	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	M/s Tejus Consultants
Contractor	Sri. M. S. Venkatesh

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)

Date of Testing	**28/06/2018**
Layer no. or level	WMM I layer
Depth of hole	250mm

Field density:	**1**	**2**	**3**
Wt. of wet material from hole (Ww) gms.	6550	6245	6545
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9590	9780	9605
Wt. of sand in cone (w3) gms.	832	810	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3578	3410	3559
Bulk density of sand (γs)gm/cc	1.32	1.32	1.32
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.42	2.42	2.43
Moisture meter reading(moisture content)	12.43	12.45	12.47
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.15	2.15	2.16
MDD	2.19	2.19	2.19
OMC	12.59%	12.59%	12.59%
% of Compaction Obtained	98.14	98.16	98.55
Compaction Required	98%	98%	98%

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

Project	**Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**		
Client	**BRUHAT BANGALORE MAHANAGARA PALIKE**		
Consultant	**M/s Tejus Consultants**		
Contractor	**Sri. M. S. Venkatesh**		
Proposed Use	BC	**Date of Sampling**	**07/07/2018**
Sample Location	At plant	**Date of Testing**	**07/07/2018**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	370.00	360.00	365.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	290.00	286.00	292.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	80.00	74.00	73.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	21.62	20.56	20.00	
5	Average Aggregate impact value	(%)	20.73			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project :	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor:	Sri. M. S. Venkatesh

Type of Material	BC	Proposed Use	BC
Sample Location	At plant	Date of Sampling	07/07/2018
		Date of Testing	07/07/2018

Size of aggregate		Flakiness Index		Elongation Index	
Passing through IS sieve, mm	Retained on IS sieve, mm	Total wt. of aggregate retained on sieves (A) gms.	Wt. of aggregate passing from Flakiness gauge (B) gms	Wt. of aggregate retained on Flakiness gauge (C) gms	Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	660	86	660	66
16.0	12.5	1255	102	1212	85
12.5	10.0	656	85	585	120
10.0	6.3	640	74	600	86
Total		3211	347	3057	357

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.81
Elongation Index(%):	11.68
Combined FI+EL (%)	22.48

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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TEJUS
CONSULTANTS

GRADATION FOR BC
(As per MORT&H 500-17,Grading-2)

Name of Work	:	**Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.**
Client	:	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant	:	M/s Tejus Consultants
Contractor	:	Sri. M. S. Venkatesh
Date of Testing	:	07/07/2018
Type of Mix	:	BC
Sample I/D	:	BC3

Sample Location:	At plant	Date of Sampling:	07/07/2018
Type of material & Purpose:	BC	Date of testing:	07/07/2018
		Oven Dry Wt.(gms):	1200.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	90	90.0	7.50	92.50	90 - 100
9.50	120	210.0	17.50	82.50	70 - 88
4.75	215	425.0	35.42	64.58	53 - 71
2.360	181	606.0	50.50	49.50	42 - 58
1.180	152	758.0	63.17	36.83	34 - 48
0.600	131	889.0	74.08	25.92	26 - 38
0.300	88	977.0	81.42	18.58	18 - 28
0.150	55	1032.0	86.00	14.00	12 - 20
0.075	110	1142.0	95.17	4.83	4 - 10
Pan	58.0				
Total	1200.0				

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ಸಹಾಯಕ ಕಾರ್ಯ ಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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TEJUS
CONSULTANTS

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX	
Name of Work :	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	09/07/2018
Type of Mix :	BC
Sample I/D :	BC1

DETERMINATION OF BITUMEN CONTENT		
Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	980	986
2. Weight of Mixture after extraction, g	928	932
3. Weight of Bitumen	52	54
4. Weight of filter paper before extraction, g	4.00	4.00
5. Weight of filter paper after extraction, g	5.00	5.00
6. Weight of fines, g	1.00	1.00
7. Weight of Bitumen & fines	53.00	55.00
8. Bitumen content in %	5.41	5.58
9. Average Bitumen content in %	5.49	
10. Minimum Bitumen content in %	5.40	

GRADATION FOR BC AFTER EXTRACTION
(As per MORT&H 500-17,Grading-2)

Sample Location:	At site	Date of Sampling:	09/07/2018
Type of material & Purpose:	BC	Date of testing:	09/07/2018
		Oven Dry Wt.(gms):	928.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	72	72.0	7.76	92.24	90 - 100
9.50	132	204.0	21.98	78.02	70 - 88
4.75	152	356.0	38.36	61.64	53 - 71
2.360	146	502.0	54.09	45.91	42 - 58
1.180	93	595.0	64.12	35.88	34 - 48
0.600	66	661.0	71.23	28.77	26 - 38
0.300	82	743.0	80.06	19.94	18 - 28
0.150	56	799.0	86.10	13.90	12 - 20
0.075	88	887.0	95.58	4.42	4 - 10
Pan	41.0				
Total	928.0				

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TEJUS
CONSULTANTS

DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	09/07/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.870	0.870	0.870
Final weight of plate after application of tack Coat (c)	Kg	0.894	0.893	0.895
Weight of tack Coat (d=c-b)	Kg	0.024	0.023	0.025
Rate of spread of tack coat	Kg/sq.m	0.267	0.256	0.278
Average	Kg/sq.m	0.267		
Specified Limit	Kg/sq.m	0.250 Kg/sq.m		

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ಸಹಾಯಕ ಅಭಿಯಂತರರು
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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರ
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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TEJUS
CONSULTANTS

DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	09/07/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.870	0.870	0.870
Final weight of plate after application of tack Coat (c)	Kg	0.893	0.893	0.895
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.025
Rate of spread of tack coat	Kg/sq.m	0.256	0.256	0.278
Average	Kg/sq.m	0.263		
Specified Limit	Kg/sq.m	0.250 Kg/sq.m		

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Balance Roads, and Drains at Vidya Sagar Layout, Doorvani Nagar, Gundu Roa Layout and Sorrounding Area in ward No 06 Thanisandra, Byatarayanapura Sub Division.
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Sri. M. S. Venkatesh
Date of Testing :	09/07/2018
Type of Mix :	Tack coat
Sample I/D :	1

Determination	Unit	Test No		
		1	2	3
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.870	0.870	0.870
Final weight of plate after application of tack Coat (c)	Kg	0.893	0.894	0.894
Weight of tack Coat (d=c-b)	Kg	0.023	0.024	0.024
Rate of spread of tack coat	Kg/sq.m	0.256	0.267	0.267
Average	Kg/sq.m	0.263		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಇಂಜಿನಿಯರ್
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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DESIGN MIX / JOB MIX FORMULA FOR BITUMINOUS CONCRETE (BC) IS BASED FROM CLAUSE 507 OF MORT&H SPECIFICATION FOR ROAD AND BRIDGE WOR.

(5TH REVISION) 2013.

REPORT FOR BITUMENUS CONCRETE MIX DESIGN

TEJUS CONSULTANTS

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Mobile No. +91 8023287532, E Mail ID: tejusconsutants@gmail.com

BITUMINOUS CONCRETE (BC)
(Design Mix / Job Mix formula)

Design Mix for Bituminous Concrete (BC) is based from Clause 507 of MORT&H Specification for Road and Bridge work (5th Revision) 2013.

Name of Work : Comprehensive Development For Roads And Drains In Ward No. 5 And 6 Under CMC And TMC Grants, Byatarayanapura Sub-Division, Yelahanka Zone,, Byatarayanapura Division. Package No 04(Consists of 23 works).

Client : **BRUHAT BANGALORE MAHANAGARA PALIKE**

Agency : **Sri. M. S. Venkatesh**

1. MATERIAL PROPOSED TO BE USED

a. Coarse Aggregate - (A) 13.2mm & D/S
(B) 9.50mm & D/S
(C) 4.75mm & D/S
(D) Coarsed dust
(E) OPC 43 grade Cement

b. Bitumen - 60/70 Penetration Grade.

d. Date of Test - 28-03-2018

2. PHYSICAL REQUIREMENTS OF COARSE AGGREGATE FOR BITUMINOUS CONCRETE (BC)

Sl. No.	Test	Requirement	Result as Per Test	Remarks
1	Grain Size Analysis Cleanliness (Dust)	5% (Max) passing 0.075mm sieve	Nil	Physical requirement of Aggregates Proposed to be used for BC conforms to MORT&H Specification
2	Flakiness and Elongation Indices (Combined)	35% (Max)	25.90%	
3	Aggregate Impact value	24% (Max)	23.20%	
4	Water absorption value	2% (Max)	0.80 %	
5	Coating and Stripping of Bitumen Aggregate to Mixtures	Minimum retained coating 95%	More than 97%	

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TEXPRO CONSULTANTS

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3. RECOMMENDED PROPORTION OF AGGREGATE AND ITS SEIVE ANALYSIS FOR BITUMINOUS CONCRETE (BC)

A.	13.2mm & Down Size	25%	Note: **Mix proportion given is for the Sample aggregates given to us.** Any Minor Mixing percentage shall be altered during production of **BC Mix** to ensure graded mix conforming to specification requirement.
B.	9.5mm & Down Size	30%	
C.	4.75mm & Down Size	23%	
D.	Coarsed dust	20%	
E.	Mineral Filler (Cement)	02%	

IS Sieve (mm)	Specified Gradation (Range) Grading 2	Result as per Test	
		Test 1	Test 2
		Cumulative % by Wt. of total aggregate passing	
1	2	3	4
19mm	100	100	100
13.2mm	90-100	95.40	96.00
9.5mm	70-88	79.50	80.00
4.75mm	53-71	62.80	61.00
2.36mm	42-58	51.00	51.80
1.18mm	34-48	42.00	43.00
0.600mm	26-38	32.00	32.10
0.300mm	18-28	23.00	23.10
0.150mm	12-20	16.80	16.20
0.075mm	4-10	7.00	7.20
Bitumen Content (% by weight to total mixture)		5.4 %(Minimum) Bitumen Binder Content Shall is ensured during production of BC mix.	

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4. BITUMEN TEST (60/70 GRADE BITUMEN or VG 30 Grade TO BE USED)

Test	Requirement as per Test as per IS 73: 2006	Result as Per Test	Remarks
1	2	3	4
Ductility	Min 50 cms	105>	Bitumen Sample conforming to 60/70 Grade as per to IS 73:2006 Specification requirement
Softening Point	Min. 45^{0}C	49^{0}C	
Flash Point	min. of 220^{0}C	308^{0}C	
Penetration	less than division of 1/100th in 5 Seconds (0.1mm, 100gms)	65, 67, 66	

5. RESULT OF MARSHAL STABILITY TEST FOR BITUMINOUS CONCRETE (BC)

Sl. No.	Test	Requirement	Result as Per Test
1	2	3	4
1.	Marshall Stability Value @ 60^{0}C (KN) Minimum	9 KN	10.38 KN
2.	Marshall flow at 60^{0}C, mm	2 – 4	3.47
3.	Percent Air Voids	3 - 6	3.71
4	Percent voids in Mineral Aggregate (VMA %)	13 – 15	13.66
5.	Percent Voids filled with Bitumen (VFB %)	65 – 75	73.00
6.	Coating with Aggregate (%)	95% (Min)	97%
7.	Bitumen Binder Content in Mix (% by weight of total mix)	5% to 7%	5.40%
8.	Degree of Compaction to be achieved (Compaction Level) gms/cc	--	2.36 g/cc

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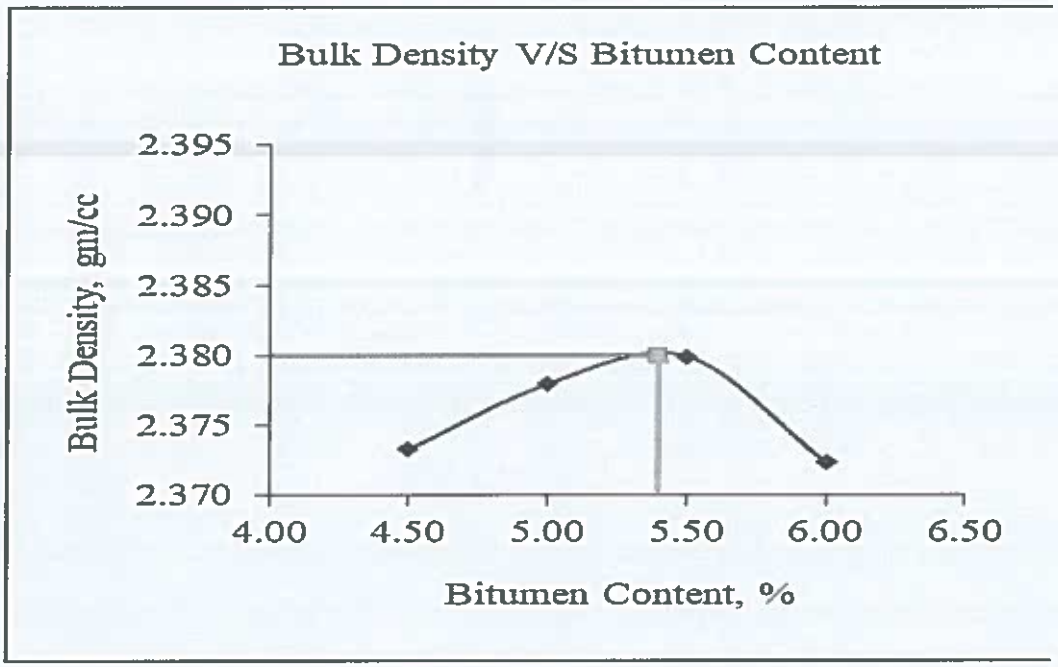

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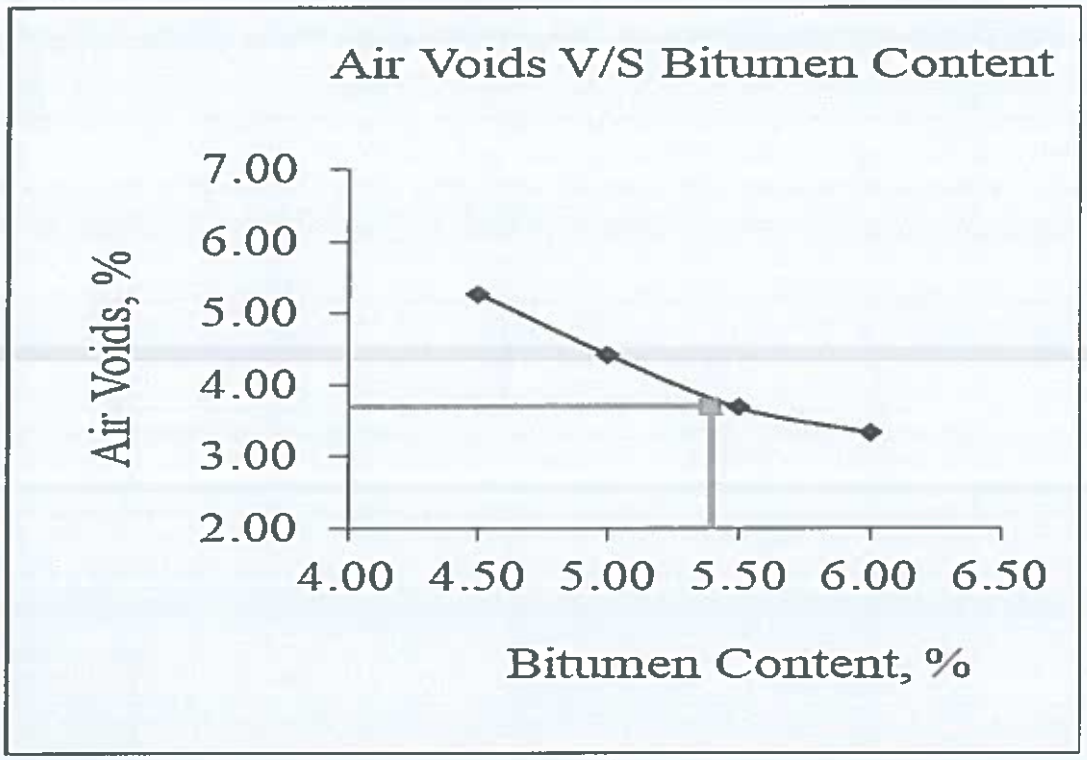

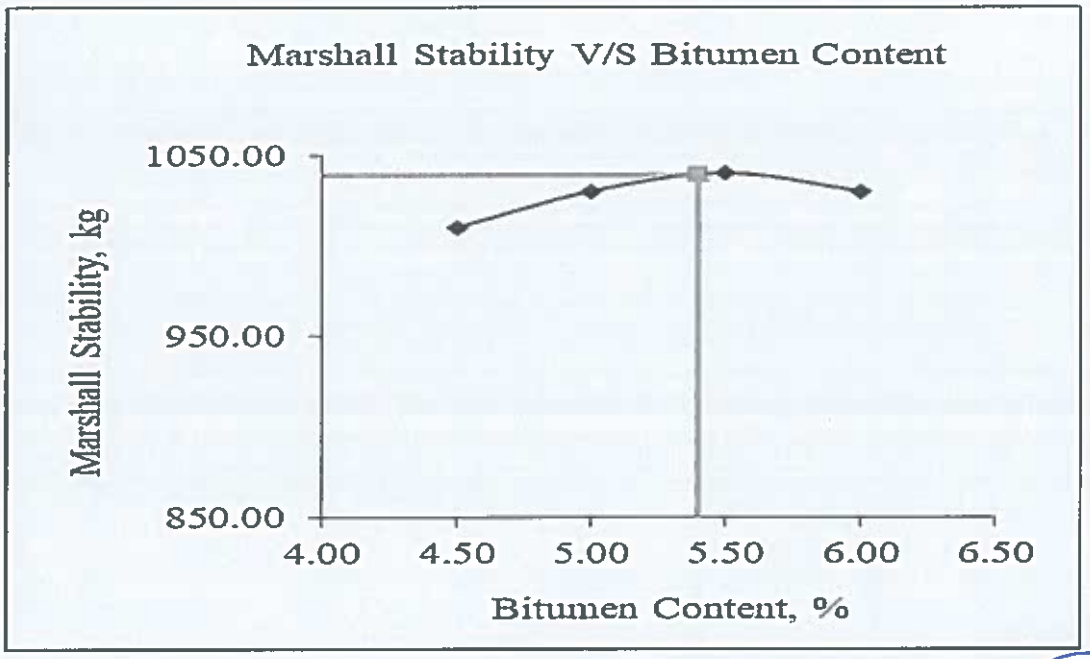

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6. MANUFACTURING AND ROLLING TEMPARATURES FOR BITUMINOUS CONCRETE (BC)

Note: 60/70 Grade Bitumen to be used

Sl. No.	Stage of Work	Temperature Range (^{0}C)
1	2	3
1.	Bitumen Binder at Mixing	150^{0}C – 165^{0}C
2.	Aggregate at Mixing	150^{0}C - 170^{0}C
3.	Mixed Material at HMP	150^{0}C -165^{0}C
4.	Laying	140^{0}C (Minimum)
5.	Rolling	90^{0}C (Minimum)

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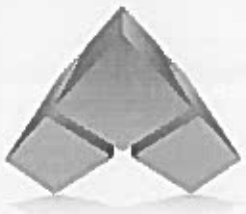
DESIGN MIX / JOB MIX FORMULA FOR DENSE GRADED BITUMINOUS MACADAM (DBM) IS BASED FROM CLAUSE 505 OF MORT&H SPECIFICATION FOR ROAD AND BRIDGE WORK (5TH REVISION) 2013.

REPORT FOR DENSE BITUMINOUS MACADAM MIX DESIGN



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DENSE GRADED BITUMINOUS MACADAM MIX DESIGN

DENSE BITUMINOUS MACADAM (DBM)
(Design Mix / Job Mix formula)

Design Mix / Job Mix Formula for Dense Graded Bituminous Macadam (DBM) is based from Clause 505 of MORT&H Specification for Road and Bridge work (5th Revision) 2013.

Name of Work : Comprehensive Development For Roads And Drains In Ward No. 5 And 6 Under CMC And TMC Grants, Byatarayanapura Sub-Division, Yelahanka Zone, Byatarayanapura Division. Package No 04(Consists of 23 works).

Client : **BRUHAT BANGALORE MAHANAGARA PALIKE**

Agency : **Sri. M. S. Venkatesh**

1. **MATERIAL PROPOSED TO BE USED**

a. Coarse Aggregate	-	(A) 26.50mm & D/S (B) 13.2mm & D/S
b. Fine Aggregates	-	(C & D) 6mm & D/S & Coarsed Dust (E) Filler (Cement OPC 43 Grade)
c. Bitumen	-	60/70 Penetration Grade.
d. Date of Test	-	28.03.18

2. **PHYSICAL REQUIREMENTS OF COARSE AGGREGATE FOR DENSE GRADED BITUMINOUS MACADAM (DBM)**

Sl. No.	Test	Requirement	Result as Per Test	Remarks
1	Grain Size Analysis Cleanliness (Dust)	5% (Max) passing 0.075mm sieve	Nil	Physical requirement of Aggregates Proposed to be used for DBM conforms to MORT&H Specification
2	Flakiness and Elongation Indices (Combined)	30% (Max)	27.45%	
3	Aggregate Impact value	27% (Max)	23.50%	
4	Water absorption value	2% (Max)	0.97%	
5	Coating and Stripping of Bitumen Aggregate to Mixtures	Minimum retained coating 95%	More than 97%	

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TEJU CONSULTANTS

ಸಹಾಯಕ ಕಾರ್ಯ ಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-24

DENSE GRADED BITUMINOUS MACADAM MIX DESIGN

3. RECOMMENDED PROPORTION OF AGGREGATE AND ITS SEIVE ANALYSIS

A.	26.5mm & Down Size Aggregate	30%	Note: **Mix proportion given is for the Sample aggregates given to us.** Any Minor Mixing percentage shall be altered during production of DBM Mix to ensure graded mix conforming to specification requirement.
B.	13.2mm & Down Size Aggregate	23%	
C.	6mm & Down Size Aggregate	25%	
D.	Coarsed dust	20%	
E.	Filler (Cement)	2%	

IS Sieve (mm)	Specified Gradation (Range) Grading 2	Result as per Test	
		Test 1	Test 2
		Percentage of passing by total aggregates	
1	2	3	4
37.5mm	100	100	100
26.5mm	90-100	93.45	94.04
19.0mm	71-95	72.16	74.63
13.2mm	56-80	59.32	58.32
4.75mm	38-54	47.91	46.53
2.36mm	28-42	30.49	32.10
0.300mm	7-21	14.08	14.83
0.075mm	2-8	5.20	4.93
Bitumen Content (% by weight to total mixture)		4.5 %(Minimum) Bitumen Binder Content Shall be ensured during production of DBM mix.	

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DENSE GRADED BITUMINOUS MACADAM MIX DESIGN

4. BITUMEN TEST (60/70 GRADE BITUMEN TO BE USED)

Test	Requirement as per Test as per IS 73: 2006	Result as Per Test	Remarks
1	2	3	4
Ductility	min 50 cms	105 >	Bitumen Sample conforming to 60/70 Grade as per to IS 73:2006 Specification requirement
Softening Point	Min. 45^{0}C	47^{0}C	
Flash Point	min. of 220^{0}C	313^{0}C	
Penetration	less than division of 1/100th in 5 Seconds (0.1mm, 100gms)	66, 67, 68	

5. RESULT OF MARSHAL STABILITY TEST FOR DENSE GRADED BITUMINOUS MACADAM (DBM)

Sl. No.	Test	Requirement	Result as Per Test
1	2	3	4
1.	Marshall Stability Value @ 60^{0}C KN Minimum	9 KN	10.38 KN
2.	Marshall Flow, at 60^0 C mm	2 – 4mm	3.3mm
3.	Percent Air Voids (%)	3 – 6	4.71
4	Percent voids in Mineral Aggregate (VMA %)	11 – 13	11.88
5.	Percent Voids filled with Bitumen (VFB %)	65 - 75	70.30
6.	Coating with aggregate (%)	95% (Min)	97 %
7.	Bitumen Binder Content (Percent by wt. of total mix %)	4.5% (Min)	4.5%
8.	Density (gms/cc)	-	2.387gm/cc

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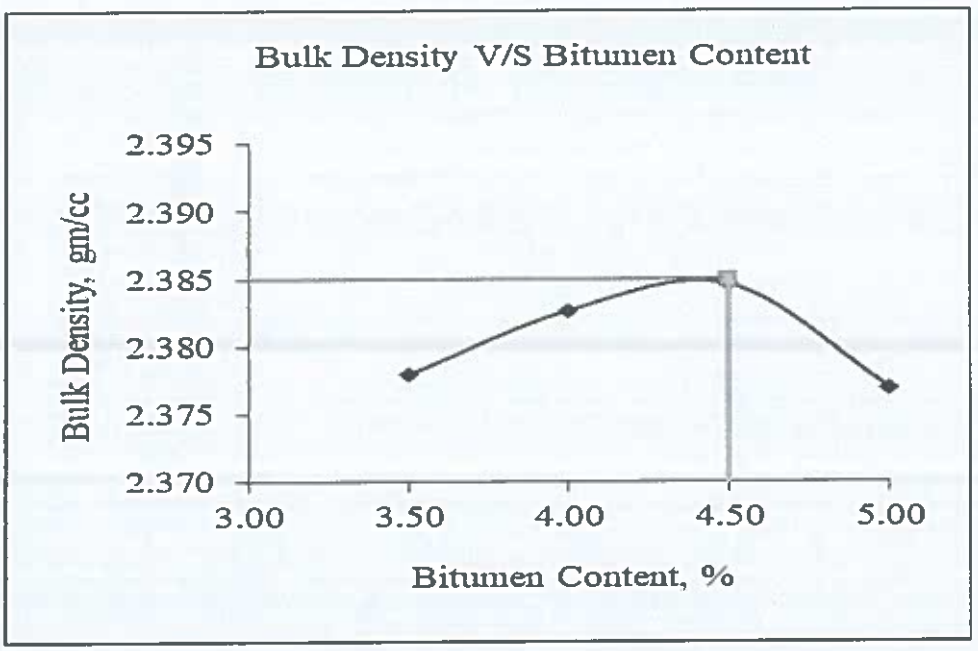
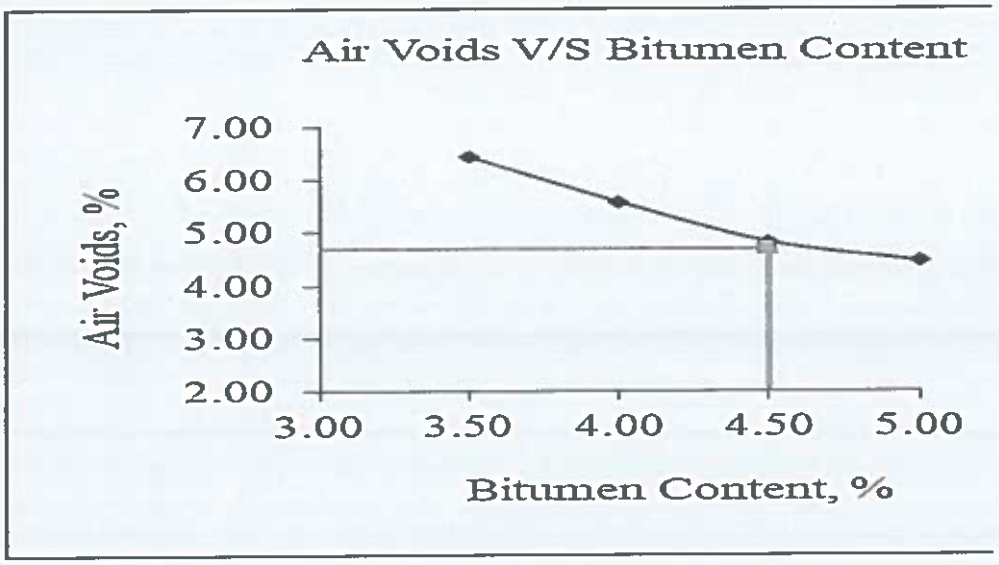
DENSE GRADED BITUMINOUS MACADAM MIX DESIGN





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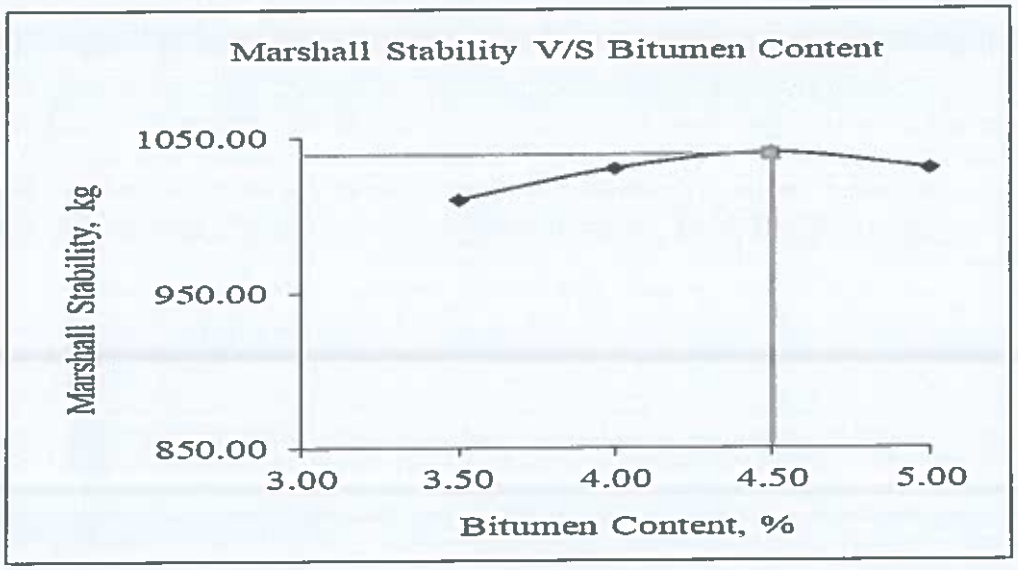
DENSE GRADED BITUMINOUS MACADAM MIX DESIGN



6. **MANUFACTURING AND ROLLING TEMPARATURES FOR DENSE GRADED BITUMINOUS MACADAM (DBM)**

Note: 60/70 Grade Bitumen to be used

Sl. No.	Stage of Work	Temperature Range (^{0}C)
1	2	3
1.	Bitumen Binder at Mixing	150^{0}C – 165^{0}C
2.	Aggregate at Mixing	150^{0}C - 170^{0}C
3.	Mixed Material at HMP	150^{0}C -165^{0}C
4.	Laying	140^{0}C (Minimum)
5.	Rolling	90^{0}C (Minimum)

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